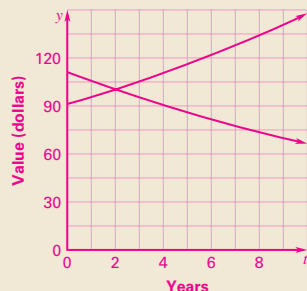


2a. See below.

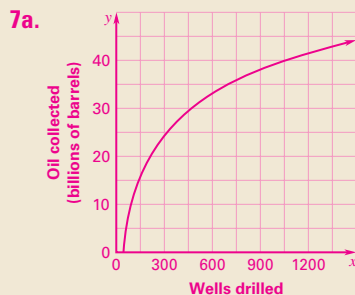
3. Sample answer:

$$y_i = 90.70(1.05)^t, y_p = 110.8(0.95)^t;$$



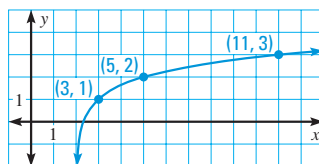
4. \$2166.57; 3 yr. Sample answer: I used my graphing calculator and entered $y = 2000e^{0.04t}$ and then checked the table to determine the first t -value that was greater than 2250.

5c. Sample answer: The 3-yr CD is a shorter period of time for your money to be tied up and it requires less money to start, but it earns less interest in its time frame; the 5-yr CD earns more interest faster, but it requires a larger amount of money to start and it ties your money up for a longer period of time.



Lessons 7.1–7.4

1. **MULTI-STEP PROBLEM** The graph shown below is a translation of the graph of $y = \log_3 x$.



$$y = \log_3(x - 2) + 1$$

- Write an equation of the graph.
 - Graph the inverse of the function whose graph is shown above. See margin.
2. **MULTI-STEP PROBLEM** When a piece of paper is folded in half, the paper is divided into two regions, each of which has half the area of the paper. If this process is repeated, the number of regions increases while the area of each region decreases. The table below shows the number of regions and the fractional area of each region after each successive fold.

Fold number	0	1	2	3	4
Number of regions	1	2	?	?	?
Fractional area of each region	1	$\frac{1}{2}$?	?	?

- Copy and complete the table. See margin.
 - Write functions giving the number of regions $R(n)$ and the fractional area of each region $A(n)$ after n folds. Tell whether each function represents *exponential growth*, *exponential decay*, or *neither*. $R(n) = 2^n$, exponential growth; $A(n) = 2^{-n}$, exponential decay
3. **OPEN-ENDED** The value of one item *increases* by $r\%$ per year while the value of another item *decreases* by $r\%$ per year. After 2 years, both items are worth \$100. Choose a value for r and write a function giving each item's value y after t years. Graph both functions in the same coordinate plane. See margin.
4. **SHORT RESPONSE** You deposit \$2000 in an account that pays 4% annual interest compounded continuously. What is your balance after 2 years? After how many full years will your balance first exceed \$2250? Explain how you found your answers. See margin.

5. **EXTENDED RESPONSE** A local bank offers certificate of deposit (CD) accounts that you can use to save money and earn interest. You are considering two different CDs: a three-year CD that requires a minimum balance of \$1500 and pays 2% annual interest, and a five-year CD that requires a minimum balance of \$2000 and pays 3% annual interest. The interest for both accounts is compounded monthly.

- If you deposit the minimum required amount in each CD, how much money is in each account at the end of its term? How much interest does each account earn? \$1592.68, \$2323.23; \$92.68, \$323.23
- What is the difference in the amounts of interest? \$230.55
- Describe the benefits and drawbacks of each account. See margin.

6. **GRIDDED ANSWER** Tritium is a radioactive substance used to illuminate exit signs. The amount of tritium disappears over time, a process called radioactive decay. If you start with a 10 milligram sample of tritium, the number y of milligrams left after t years is given by $y = 10e^{-0.0564t}$. How many milligrams of tritium are left after 10 years? Round your answer to the nearest hundredth. 5.69 mg

7. **MULTI-STEP PROBLEM** The amount y of oil collected by a petroleum company drilling on the U.S. continental shelf can be modeled by $y = 12.263 \ln x - 45.381$ where y is measured in billions of barrels and x is the number of wells drilled.



- Graph the model. See margin.
- About how many barrels of oil would you expect to collect after drilling 1000 wells? about 39 billion barrels
- About how many wells need to be drilled to collect 50 billion barrels of oil? about 2387 wells

2a.

Fold number	0	1	2	3	4
Number of regions	1	2	4	8	16
Fractional area of each region	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$